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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,723	09/09/2005	Volker Brose	710.1013	8901

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Davidson, Davidson & Kappel, LLC
485 7th Avenue
14th Floor
New York, NY 10018

EXAMINER	
BECKER, JOHN E	

ART UNIT	PAPER NUMBER
4177	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,723	BROSE ET AL.	
	Examiner	Art Unit	
	JOHN BECKER	4177	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/9/2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10,11 and 15-18* is/are rejected.

7)☒ Claim(s) *12-14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/15/2008, 11/21/2007, 11/09/2007, 11/05/2007, 12/11/2006, 9/9/2005, 5/23/2005, 3/14/2005* .
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to applicant's application and preliminary amendment filed on 3/14/2005.

Information Disclosure Statement

2. "Integrated Architecture Logix Platforms", Rockwell Automation CD-ROM publication, xx, xx, December 2000, pp.45-46, XP002278110 was not considered because CD-ROM is not available for review.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claim 15** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant claims "The method as recited in claim 10 wherein a TCP/IP interface is used for communicating between an open-loop control system of the robot and an evaluation unit of the sensor system." This claim is indefinite, because it is unclear how the method step in this claim is related to method claim 10. Is the method step in this claim further defining "the moving" steps in claim 10 or the mounting step (i.e. "the flap being connected")?

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. **Claims 10, 11, and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Tassakos (DE-19930087) in view of Alborante (EU-470939).

As per **claim** 10, Tassakos discloses a gripping tool and a sensor attached thereunto (See paragraph 3, "[t]o grasp on several objects can the manipulator as a gripper be formed … the manipulator has a measuring head to measuring the surface process of an object, a gap width, a gap scatter, or a layer thickness.")

Tassakos discloses an iterative closed-loop control process because of repeated feedback given to compare the correction vector to the abort criteria. More specifically, Tassakos states, "[t]he control of the reproaching position becomes preferably aborted, if each of the elements of the correction vector is smaller than an abort criterion," (paragraph 32, Description).

Tassakos states that said process is "in particular [to be] inserted in the automotive industry in manufacture and quality assurance," (paragraph 2).

In regards to the moving step particular to the iterative closed-loop control process, Tassakos describes a setup phase for preparing a robot manipulator to move from one location to another with a high degree of accuracy:

> "characterized in that before the control of the reproaching position [before movement]:
> - the target reproaching position is started,
> - becomes a target measuring vector (y_soll) with the measurement data received [setpoint generated],
> - becomes for each degree of freedom a manipulator (2) of the handling equipment (1) from the target reproaching position in several reproaching positions moved and in each reproaching position a measuring vector received,
> - becomes for each degree of freedom for the same measurement data of the measuring vectors the amount of the gradient determined and in a gradient matrix (C) stored, and in the frame of the control of the reproaching position," (claim 7).

This states that prior to the movement of the robot manipulator, a robot manipulator starts at a reference position independent of the workpiece (target reproaching position), a setpoint value (target measuring vector) is measured and a Jacobi matrix (gradient matrix, "The gradient matrix can become also known as a Jacobi matrix," (paragraph 26 of the Description)) is calculated during this setup phase.

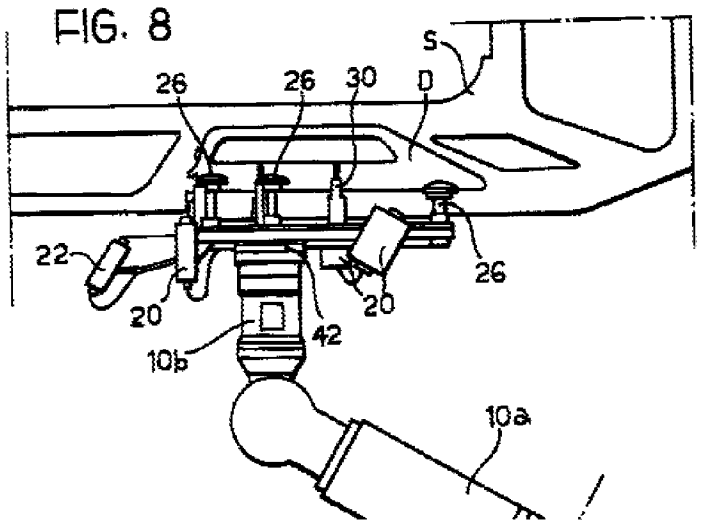
Tassakos then describes measuring an actual value, finding the difference between it and a setpoint value, using the actual value to calculate a movement vector, and moving as directed by the movement vector (claim 7).

> "-a correction vector (D_x) from the multiplication of the reciprocal value of the gradient matrix (C) with the difference of the target measuring vector (y_soll) and an actual of measuring vector (y_ist) in the actual reproaching position of the manipulator (2) or on the basis another suitable method determined becomes and
> - becomes the reproaching position in dependence of the correction vector (D_x) controlled."

However, Tassakos does not specify connecting a flap to a workpiece.

Alborante discloses a method of mounting doors automatically on vehicle bodies wherein a gripping tool guided by a robot and a sensor system connected to the

gripping tool, the sensor system having at least one sensor are also disclosed, (Fig 8). Also disclosed is the connection of the workpiece in the mounting position of the gripping tool: “[w]hen data relating to the hinges has been acquired, the two welding robots 14 and 16 can start to weld the flanges 40a of the hinges 40 to the body S," (col 4, lines 2-5).



Tassakos states that his invention using a gripper and an attached sensor was for use in the automotive industry, but was silent on the specific operations for the use of said invention. Alborante teaches a process of moving and mounting a flap in the automotive industry using a robot gripper with an attached sensor. It would have been obvious to combine Tassakos with Alborante since both references including moving an object in the automotive field to a specified location and Alborante would have added the natural step of attaching the part to the workpiece to complete the assembly of the flap.

As per **claim 11**, Tassakos teaches an iterative threshold through the "abort criterion", (paragraph 33).

As per **claim 16**, see Alborante above for the statement of a car door (Fig 8).

7. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tassakos (DE-19930087) in view of Alborante (EU-470939), as applied to claim 1, and further in view of NIST Manufacturing Engineering Laboratory, “ISD’s Research Areas: Intelligent Open Architecture Control of Manufacturing Systems”.

Tassakos and Alborante disclose an open-loop control system of the robot since no feedback is involved: “the robot 10 locates the frame 12 in a reference position at the door opening V according to a predetermined operating program,” (Alborante col 3, line 30). The “predetermined operating program” of Alborante occurs in the "evaluation unit". There must be communication between the "evaluation unit" and the "predetermined operating program" of Alborante for this to happen.

Neither Tassakos nor Alborante disclose a TCP/IP interface for communication between the open-loop control of the robot and the evaluation unit as no mode of communication is specified between the two entities.

A reference in an analogous art “ISD’s Research Areas: Intelligent Open Architecture Control of Manufacturing Systems” teaches that TCP/IP is so common that General Motors created a General Requirements Specification for Robot Controllers wherein the use of TCP/IP for robot controls was discussed, (p. 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use TCP/IP as a communication interface between the open-loop control system and the evaluation unit in the combination of Tassakos and Alborante because this would allow for the robot and evaluation system to "communicate more broadly, integrate more easily, predict results and … avoid diagnostic mistakes and optimize productivity," (paragraph 2).

8. **Claim 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Alborante (EU-470939) in view of Yoshimi, "Active Uncalibrated Visual Servoing".

Alborante teaches of a gripping tool (12) guided by a robot (10), and a sensor system (20,22) attached thereunto (Fig 8). Alborante discloses an open-loop control system of the robot since no feedback is involved: "the robot 10 locates the frame 12 in a reference position at the door opening V according to a predetermined operating program," (Alborante col 3, line 30). The "predetermined operating program" of Alborante occurs in the "evaluation unit". There must be communication between the "evaluation unit" and the "predetermined operating program" of Alborante for this to happen.

Alborante teaches a calibrated sensor, but does not teach an uncalibrated sensor.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the calibrated sensor of Alborante and Tassakos with an uncalibrated sensor of Yoshimi, because "[c]alibration is known to be a difficult and error

prone process," and substituting an uncalibrated sensor would eliminate this error, (Yoshimi, col 1, lines 6-10).

9. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Alborante (EU-470939) in view of Yoshimi, "Active Uncalibrated Visual Servoing" as applied to claim 17 above, and further in view of Pryor (4,666,303).

Alborante and Yoshimi teach a CCD camera, but not of an optical gap sensor.

However, It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the CCD camera of Alborante in view of the optical gap sensor of Pryor, because Pryor teaches of electro-optical gap sensors used to detect "fit up of panels as on car bodies," (Abstract). Moreover, Pryor suggests "In the manufacture of cars it is highly desirable for 'customer aesthetic' purposes that the panels, such as doors, for example, when fitted together with the other panels, have a uniform gap falling within a nominal size as one looks along the gap," (col 1, lines 6-10).

Double Patenting

10. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s)

because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. **Claims 10, 11, 17, and 18** are provisionally rejected on the ground of nonstatutory double patenting over claims 9, 10, 15, and 16 of copending Application No. 10/527,629. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows:

Claim 10 (APPLICATION 10/527,723): A method for mounting a flap on a workpiece, the flap being positioned
precisely with respect to a reference area on the workpiece using a gripping tool guided by a robot, the gripping tool including a securing device for holding the flap and a sensor system fixedly connected to the gripping tool, the sensor system including at least one sensor, the method including:

moving the gripping tool during a positioning phase from a proximity position independent of a workpiece position of the workpiece in a working space of the robot into a mounting position, the flap in the mounting position being held in the gripping tool and being oriented in a precisely positioned fashion with respect to the reference area of the workpiece, the flap being connected to the workpiece in the mounting position of the gripping tool,
the moving including running an iterative closed-loop control process, the closed- loop control process including:

generating an actual measured value of the at least one sensor;
comparing the actual measured value with a setpoint measured value generated during a setup phase,
calculating a movement vector of the gripping tool from a difference between the actual measured value and the setpoint measured value using a Jacobi matrix calculated during the setup phase; and
moving the gripping tool by an amount equal to the movement vector.

Claim 9 (APPLICATION 10/527,629): A method for the mounting of an add-on part on a workpiece, the add-on part being mounted on the workpiece in a precisely positioned manner in relation to a reference region, a mounting tool being guided by a robot and including a fixing device for picking up the add-on part, and a sensor system being connected fixedly to the mounting tool and having at least one sensor, the method comprising:
during a positioning phase, first moving the mounting tool with the add-on part held in the fixing device from a proximity position independent of a position of the workpiece in a working area of the robot into a mounting position, the add-on part held in the mounting tool being aligned in the mounting position in a precisely positioned manner in relation to the reference region of the workpiece,
the add-on part then being connected in the mounting position of the mounting tool to the workpiece, and
the positioning phase including, in order to approach the mounting position, running through an iterative control operation including:
producing an actual measured value of the at least one sensor;
comparing the actual measured value with a desired measured value produced within the context of a setting-up phase,
calculating a movement vector of the mounting tool from a difference between the actual measured value and the desired measured value using a Jacobi matrix calculated during the setting-up phase, and
displacing the mounting tool using the movement vector.

As per **claim 10**, the claim specifies a “flap” while Claim 9 of application 10/527629 specifies an “add-on part”.

However, a “flap” is a specific type of “add-on part”. In the specification of the present application, the applicant defines a "flap” to be “a pivotable add-on part which is attached to another component, in the present case the body, by means of a hinge, a joint or the like.”

It would have been obvious at the time of the invention for the applicant to specify a “flap” in claim 10 for "add-on part" in claim 9 of application 10/527629.

Claim 10 specifies an “iterative closed-loop control operation” while Claim 9 of application 10/527,629 specifies an “iterative process”.

However, an “iterative closed-loop” process is a type of “iterative process”. In the specification of application 10/527,629, the applicant specifies that “the add-on part, which is aligned in the mounting position by means of a closed-loop,” (paragraph 25). The applicant specifies that “iterative process” means "iterative closed-loop process".

It would have been obvious at the time of the invention to further specify an “iterative process” as an “iterative closed loop control operation” since “closed loop” is one of a finite number of "iterative control operations”.

Claim 11 (APPLICATION 10/527,723): The method as recited in claim 10 wherein the iterative closed-loop control process is completed if either the difference between the setpoint measured value and actual measured value lies below a predetermined threshold value, or a reduction, brought about in successive iteration steps, in the difference lies below a predefined threshold.

Claim 10 (APPLICATION 10/527,629): The method as recited in claim 9 wherein the iterative control operation is terminated if either the difference between the desired measured value and the actual measured value lies below a predetermined threshold value, or a reduction in the difference during consecutive iteration steps lies below another predetermined threshold value.

As per **claim 11**, the claim states “iterative closed-loop control” and claim 10 of application 10/527629 states “iterative control”. Please see above for a discussion of obviousness relating to these two claims.

Claim 17 (APPLICATION 10/527,723): A device for mounting a flap on a workpiece comprising:
a gripping tool guided using a robot;
a sensor system fixedly connected to the gripping tool and including a metrically- non-calibrated sensor;
an open-loop control system for open-loop controlling the robot and the gripping tool; and
an evaluation unit for evaluating measured values of the sensor system.

Claim 15 (APPLICATION 10/527,629): A mounting system for the mounting of an add-on part on a workpiece, the mounting system comprising:
a mounting tool guided with aid of a robot; a sensor system connected fixedly to the mounting tool and including at least one sensor; a control device for controlling the robot and the mounting tool; and
an evaluation unit for evaluating measured values of the sensor system, the at least one of the sensors being a metrically uncalibrated sensor.

As per **claim 17**, the claim states "a flap" and claim 15 of application 10/527,629 states an "add-on part". See above for a discussion of “flap” and “add-on part” and why they are obvious variants.

The claim also states "[a] device comprising an open-loop control system" while claim 15 of application 10/527,629 states “a control device”.

However, a “device comprising an open-loop control system” is a type of “control device”. In the specification of application 10/527,629, the applicant specifies that “[a]n open-loop control system 16 is provided for controlling the position and movement of the robot 14 and of the mounting tool 5," (paragraph 43). The applicant specifies that “control device” means "device comprising an open-loop system".

It would have been obvious at the time of the invention to further specify a “control device” as a “device comprising an open-loop system” since “device comprising an open-loop system” is one of a finite number of "control devices”.

Claim 18 (APPLICATION 10/527,723): The device as recited in claim 17 wherein the sensor is an optical gap measuring sensor.

Claim 16 (APPLICATION 10/527,629): The mounting system as recited in claim 15 wherein the at least one sensor is an optical gap-measuring sensor.

As per **claim 18** of the application and claim 16 of application 10/527,629, these claims are identical except for the claims on which they depend.

Allowable Subject Matter

Claims 12-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per **claims 12-14**, while Alborante and Tassakos disclosed a method for moving, aligning, and mounting a door using a closed-loop control system utilizing a Jacobi matrix, said references did not disclose a subsequent method of moving the flap into an avoidance position using open-loop control, moving hinges to a desired location using a closed-loop process and attaching said hinges to the workpiece. No prior art found in the search met these limitations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN BECKER whose telephone number is (571)270-7536. The examiner can normally be reached on Monday-Friday 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Yao can be reached on 571-272-1224. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOHN BECKER/
Examiner, Art Unit 4177

November 3, 2008

/Sam Chuan C. Yao/
Supervisory Patent Examiner, Art Unit 4111